



History and Action Plan Overview

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NIST

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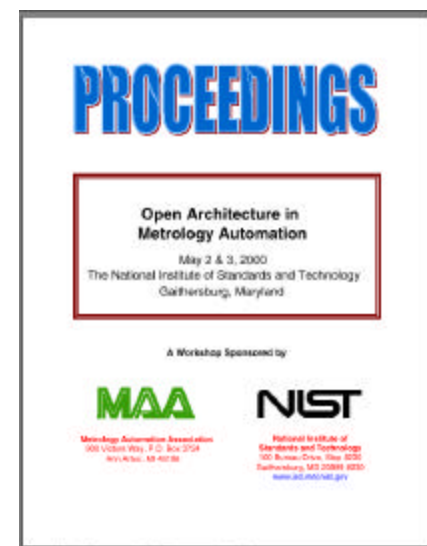
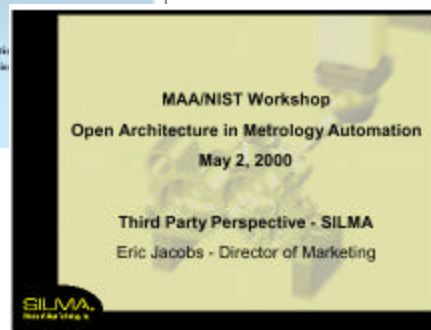


Intelligent Systems Division
Manufacturing Engineering Laboratory



Open Architecture in Metrology Automation Workshop, May 2000

- Purpose: To identify problems related to automated metrology system interoperability, and to identify specific actions towards solving these problems.
- ~50 attendees (users, vendors, third party OEMs, systems integrators, and government)





Key Workshop Action Items

- Identify standards gaps and overlaps
- Create or identify an “umbrella” organization to play a leadership role in moving standards to completion and resolving conflicts
- Create National Metrology Testbed

Bring users and vendors together to work toward standardization



“Data exchange roadblocks must be eliminated...”

Targeted impacts:

- Reduction of product development cycle time
- Elimination of redundant programs
- Elimination of proprietary interfaces
- Improved product launch/product quality
- Decreased training expense

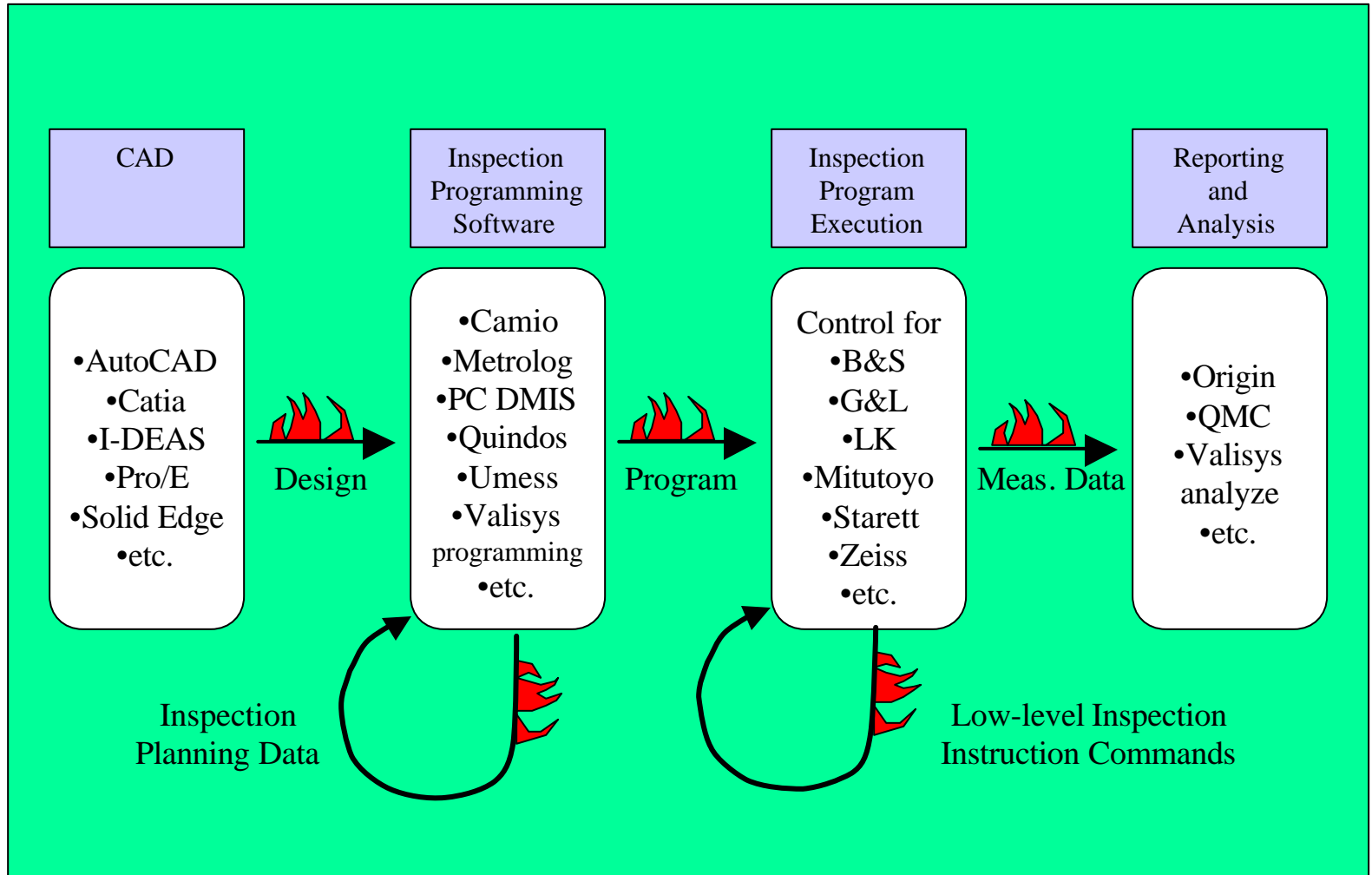
-- DaimlerChrysler White Paper:

Need for a National Metrology Testbed



Action Item: Identify Standards Gaps and Overlaps

- NIST is producing standards analysis document
- 15 Activities identified
- 39 Interfaces identified
- Currently hot interfaces identified
- Metrology data languages and APIs discussed
- General language and modularizing issues discussed
- **More details in next presentation**



Metrology Automation Major Systems and Hot Interfaces



Inspection Programming

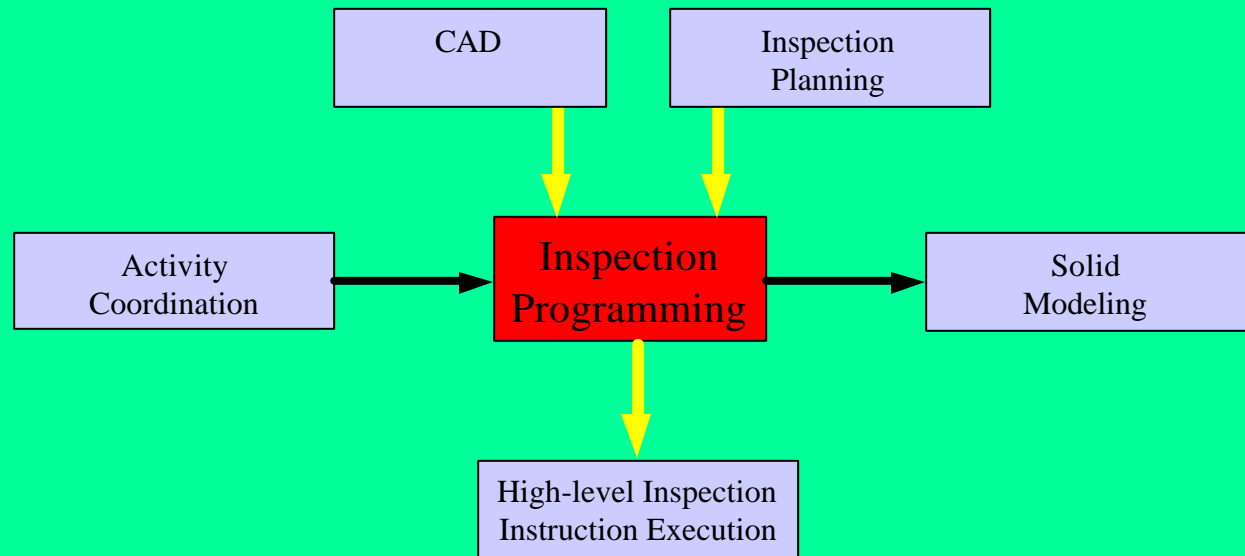
Active interface from Activity Coordination: No commonly used format.

Active interface to Solid Modeling: multiple commercial modeler APIs.

Data interface to High-level Inspection Instruction Execution: DMIS input language and multiple commercial CMM programming languages.

Data Interface from Inspection Planning: STEP AP 219.

Data Interface from CAD: STEP APs 203, 214, 224 and multiple commercial CAD formats.



Example: Inspection Programming Interfaces
active interfaces shown in black, data interfaces in yellow



Action Item: Create National Metrology Testbed

- Need a mechanism for testing interface specifications and implementations
- Proposal: Testbed should be distributed, with single threads through the metrology process implemented at industry locations and at NIST
- Jointly develop interface specifications and conduct pilots to share test procedures, tools, and data to establish conformance and interoperability
- NIST leads development of test methods and the communication of test results
- Plan and coordinate activities via proposed consortium



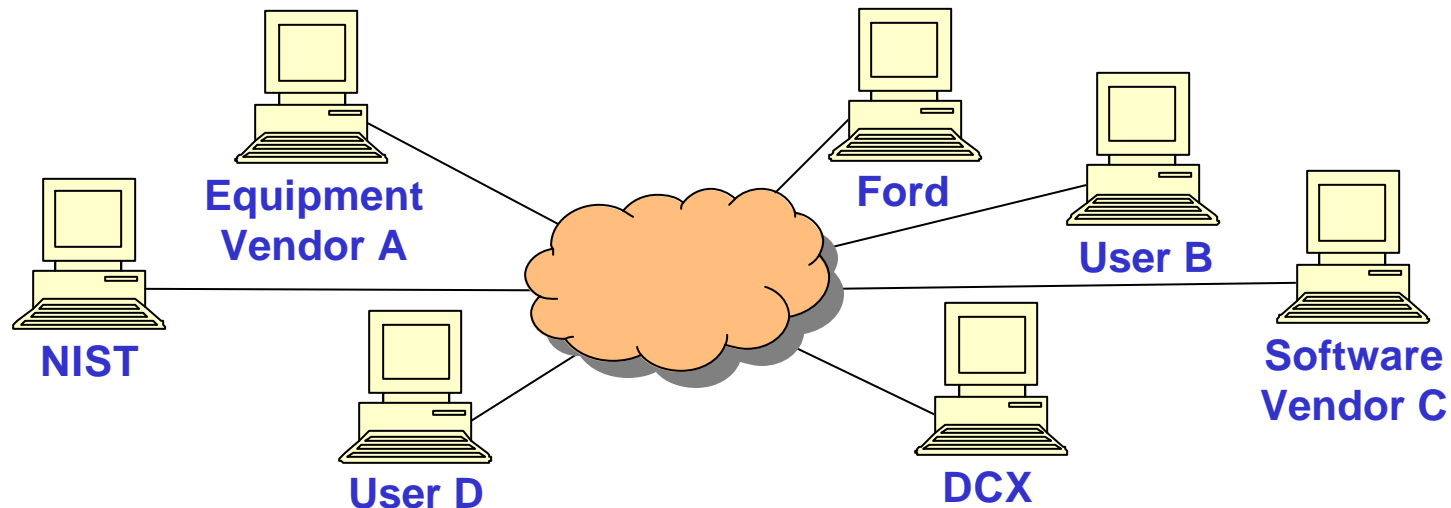
Distributed Testbed Characteristics

- Limited amount of equipment located at NIST, sufficient for test method development and validation, and for post-mortem analysis of test failures
- Bulk of the equipment involved in testing would be physically distributed and networked
- Actual testing would be done by industry at their nodes, with file sharing via email, ftp, etc.
- NIST node would include an end-to-end thread through design, planning and simulation, execution, and analysis of dimensional inspection
- Based on testing model used in AutoSTEP project



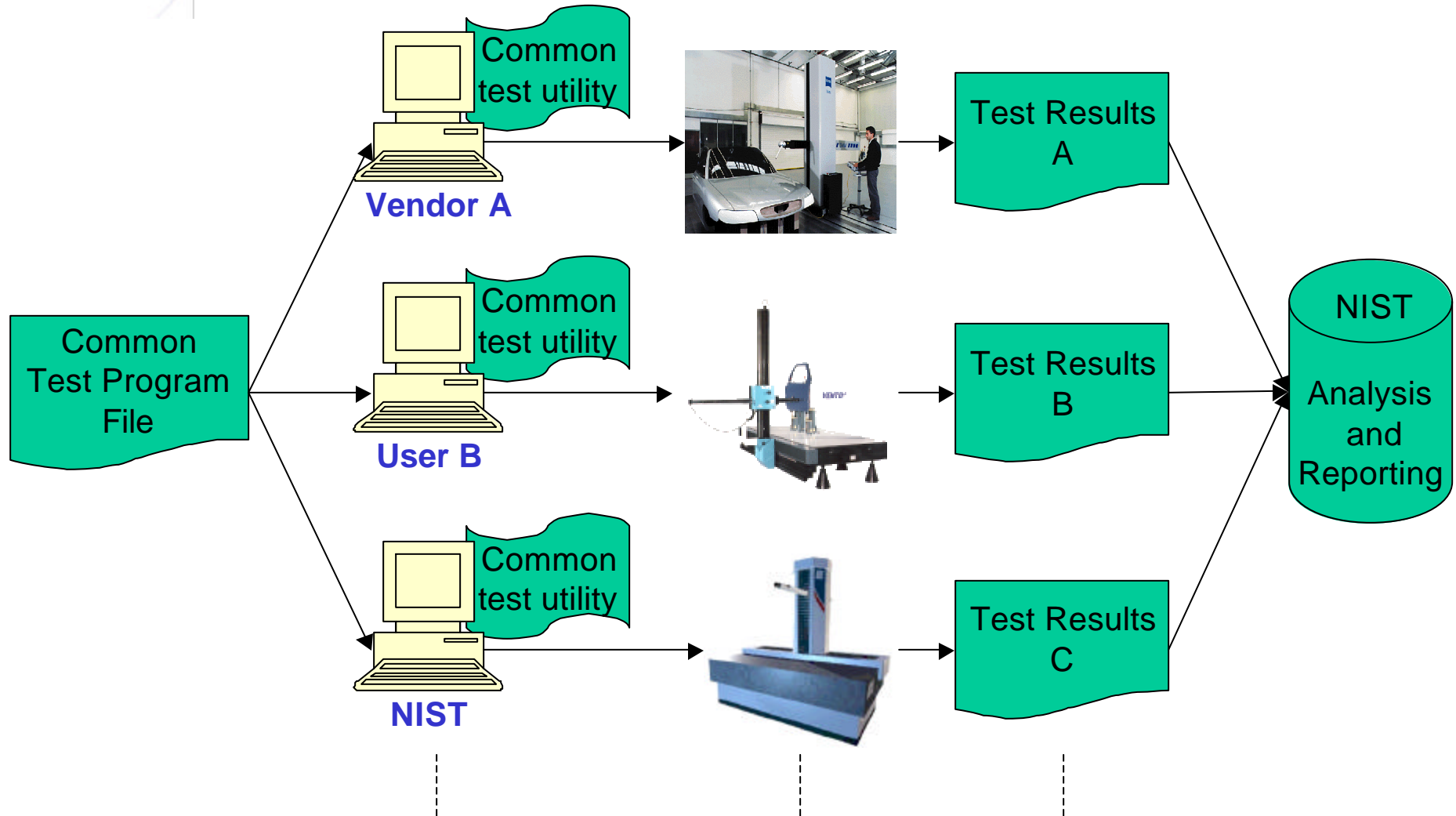
Distributed Testbed Advantages

- No single participant needs to learn and support multiple vendors' software and hardware in each category
- Faster generation of test methods and results
- Increased industry involvement and commitment
- Can include broader range of hardware and software





Example Testing Scenario





Action Item: Create Umbrella Organization

- Organizational framework is needed to coordinate specification development and testing activities
- Propose to form a new consortium to address this need
- Role of NIST: Active participation in consortium standards development and testing activities, lead development of test methods and communication of test results
- **More details in later presentations**